LBNL-47858 Abs.

This abstract was prepared for an oral presenation at the synmposium, “Heavy Element Research”, to be held at the Actinides 2001 International Conference at Hayma, Japan, November 4-9, 2001.

Prepared: May 3, 2001

Toward on-line chemistry studies of hassium (element 108) at the Berkeley Gas-filled Separator

Heino Nitsche[1],Uwe W. Kirbach[2], Charles M. Folden III[3], Thomas N. Ginter[4], Kenneth E. Gregorich[4], Darleane C. Hoffman[3], Diana M. Lee[4], Victor Ninov[4], Jon Petter Omtvedt[5], Joshua B. Patin[3], Nicole K. Seward[4], Dan A. Strellis[6], Ralf Sudowe[4], Philip A. Wilk[3], and Peter M. Zielinski[3]. (1) The Glenn T. Seaborg Center (GTSC), Lawrence Berkeley National Laboratory (LBNL) and Chemistry Department, University of California at Berkeley, 1 Cyclotron Rd, MS 70A-1150, Berkeley, CA 94720, HNitsche@lbl.gov (2) Nuclear Science Division and GTSC, LBNL, (3) Nuclear Science Division, LBNL and Chemistry Department, University of California at Berkeley, (4) Nuclear Science Division, LBNL (5) Department of Chemistry, University of Oslo, (6) Nuclear Science Division, LBNL and Nuclear Engineering Dept., University of California at Berkeley

A new concept has been implemented for heavy element chemistry research using an ion separator to separate the desired products from by-products prior to chemical studies. A Recoil product Transfer Chamber (RTC) was designed and attached to the Berkeley Gas-filled Separator (BGS) to collect and transfer the recoiling products to a suitable chemical separation system. Furthermore, a Cryo-Thermochromatographic Separator (CTS) was constructed as a chemical separation and detection system for the highly volatile tetroxides of osmium and hassium (Hs), element 108. Hs is expected to behave like group 8 elements. A helium stream was used to transport α-active OsO_4 between two rows of α detectors cooled by liquid nitrogen to provide a negative temperature gradient from about –20 to –100 ° C. Using Monte Carlo simulations, the adsorption enthalpy of OsO_4 was calculated from the measured distribution of the OsO_4 that was deposited on the detector surface as a function of the temperature.

Acknowledgements: This work is supported by the U.S. Department of Energy under Contract No. DE-AC03-76SF00098